Weed Watchin'

An Annual Newsletter for Volunteer Weed Watchers

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Weed Watchin' Welcome

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Welcome to the second edition of *Weed Watchin'*, the DES newsletter targeted towards lake residents, lake recreationists, and volunteer Weed Watchers on our beautiful lakes and ponds in New Hampshire. On the following pages you will find news on invasives, tips on identifying exotic and native plants, and new equipment to aid in your weed watching activities. Before you delve into the pages of this newsletter we would first like to update you on some exciting news.

The next couple of years promise to be busy ones, with many research endeavors taking place to find new and better solutions to the threats posed to our New Hampshire waterbodies by our number one aquatic threat, variable milfoil.

A DES-funded research project with the University of New Hampshire (UNH) and the Suncook Lake Association (SLA) is currently under way to test both the effectiveness and transport of the aquatic herbicide 2,4-D in Suncook Lake, Barnstead. A targeted application of this aquatic herbicide was conducted on June 25. Since then, SLA and UNH have been monitoring chemical concentrations in the lake and near-shore wells, as well as the effects of 2,4-D on the milfoil population. So far, the herbicide is proving very effective on the plants, and no traces of the chemical have been found in the near-shore wells. Information will be available on the DES website at *www.des.state.nh.us/wmb/exoticspe-cies/* as more data become available.

We also have more exciting news to report! Thanks to the efforts of Senator Judd Gregg, DES will be the recipient of nearly $1,000,000 of federal research funds to be spent strictly on research to control or better understand the biology and ecology of variable milfoil. There are currently 13 grant applications being reviewed by DES from universities, consulting firms, and special research entities.

DES will announce final grant recipients by August or September 2004. It's anticipated that funds will be received by DES later in the fall.

Research proposals include directed research into biological controls, genetics, chemical controls, economic impacts, and the biology and ecology of variable milfoil. Research will take place from 2004 into 2006, under the direction of DES.

Inside

VOLUNTEERS!

If you are interested in participating in the Volunteer Weed Watcher Program, or if you would like a refresher training session, please contact Amy Smagula at (603) 271-2248 or asmagula@des.state.nh.us. If you see anything even remotely suspicious, collect a representative sample of the plant (preferably with seeds or flowers), wrap it in a moist paper towel, seal it in a Ziploc bag, and deliver or send it to the DES Limnology Center, 29 Hazen Drive, Concord.

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Native Plant Focus

Pondweeds – *Potamogeton spp.*

Pondweeds are among the most common and most diverse aquatic plant genus in the state. There are 26 known species in New Hampshire, including a few that are well known, such as bassweed and Robbins pondweed. They are found in both acidic and basic waters, along with many other chemical conditions ranging from fresh to brackish. Pondweeds are often associated with other organisms; for example, bassweed provides a considerable amount of shade and hiding spots and is therefore associated with the bass found among it. Pondweeds come in all shapes, sizes and habitats. Some are found submerged with floating leaves while others are completely submerged.

Pondweeds help to oxygenate the water as well as recycle nutrients. Pondweeds are able to absorb nutrients and carbon dioxide through their leaves rather than through their roots. They do not have thick rhizomes (roots) like water lilies or cattails, therefore, all the metals and nutrients needed for survival are absorbed through the structures exposed directly to the water. Some pondweeds are able to be exposed to harsh conditions such as brackish water containing high amounts of salt and high levels of pollution. These plants are also important to the ecology of lakes, serving as a food source for wildlife.

Sometimes pondweeds can become too abundant in areas and become a nuisance rather than being beneficial. Masses of weeds can actually cause fish to become stunted and predator fish to die-off, because they are unable to find enough food among the weeds. They can also cause anoxic (no oxygen) conditions within the water column, because, in their abundance, they consume more oxygen than they release. This can happen with any plant species or group, but often pondweeds have such large biomass that when the plants die back for the winter, anoxic conditions can occur.

Did you know ...?
Potamogeton literally translates to "river weed," but that it's found in all types of water bodies, not just rivers?

EXOTIC AQUATIC PLANT ALERT!

Yellow Iris (*Iris pseudacorus*)

The yellow iris is an exotic species in the southern portion of the United States. Several studies have been done in New Hampshire to determine the severity of their invasiveness. While currently listed as a watch species by the NH Department of Agriculture, it is possible that in the near future this species could find its way onto our prohibited list.

This rather beautiful iris was originally from Europe and it made its way to the United States via the nursery trade. From there it spread rapidly throughout the countryside by its various modes of reproduction. This plant has adapted to life on lake margins by developing thick rhizomes (roots) beneath the sediment surface. This plant is also successful because of its allelopathic characteristics, in other words, the plant produces toxins to inhibit other plants from growing nearby, and to inhibit animals from eating the shoots.

Yellow iris has three means of reproduction: vegetatively (fragmentation), budding of the rhizome, and sexual reproduction. This plant can be pollinated by a large variety of long-tongued insects such as bees, moths and butterflies, thus giving it many opportunities to sexually reproduce. The yellow iris produces a seed pod near the end of summer that is filled with thousands of seeds ready and able to germinate during the following spring. These seeds are distributed through the air and water. Sometimes they germinate in the water itself and settle once they float onto land.

This flower is not eaten by most herbivores because the plant contains poisonous glycosides. Therefore, the yellow iris has no natural enemies within the United States. Yellow iris produces thick mats of leaves and rhizomes, which are extremely successful at outcompeting native plants like the cattails or pickerelweed by blocking out sunlight. Because of its well-adapted reproductive methods, *Iris pseudacorus* colonizes in large numbers.

This plant does have a desirable characteristic as well; it is efficient at removing metals from water, and is often used in wastewater treatment for just this purpose.

If you notice a population of the pretty but invasive plant that seems to be growing and expanding rapidly, please contact the Exotic Species Program at (603) 271-2248, so that we can investigate.

Tools of the Trade

View Scopes: A Plus for Any Weed Watcher

As any Weed Watcher would know, it is extremely difficult to determine what a plant is based on its characteristics above water, let alone when a plant is underwater. Therefore, weed watchers across the state are asking for information about underwater view scopes. It may be preferable to construct your own, but in the scope of things (pardon the pun) it is often easier to purchase one.

Many different companies offer these scopes. A simple web search using search terms like “aquascope,” “view scope,” or “aquatic viewers” can lead you to the various sites where these may be purchased.

Make Your Own View Scope

Special thanks to Robert “Woody” Wood from Lake Sunapee Protective Association for the following instructions.

Materials

4" diameter PVC (white) pipe in schedule 30 or 40 (Aqua Scopes are about 24" long)

PVC glue

4" diameter PVC coupler (provides an edge or little “shelf” for the plexiglass to be secured)

Plexiglass

Clear silicone caulk (good quality, 100% silicone)

Handle

2 screws to attach handle to PVC (pilot holes for screws are needed)

Foam pipe insulation (or similar for face protection and shading to be fitted/secured on coupler)

1. Cut plexiglass in a circle (needs to be pretty accurate), size to fit into coupler (slightly smaller than outside diameter of pipe) cutting this to exact size with a clean edge. This can be tricky, so use a sabre saw or jig saw with a fine-toothed blade and make sure the plexiglass is well secured when cutting. It may be necessary to use a grinding wheel and/or file to get it to proper size and shape.
2. Cut and file plexiglass circle. Make sure it fits onto coupler shelf with just a little “play.”
3. Clean edge of plexiglass and the inside “shelf” of coupler. Lay a fine, continuous bead of clear silicone on this shelf and place clean plexiglass circle onto the caulking and press in – don’t squeeze all of the silicone out.
4. Lay another continuous bead around the plexiglass edge to seal from both sides, **wet** your finger and push/drag lightly on the silicone going around the outside edge circle to seal plexiglass against the PVC.
5. Mount handle with 2 screws (stainless steel sheet metal screws are best). You should pre-drill holes with drill bit smaller than screw size. A little PVC glue in pilot holes and on screws will help to secure them. Avoid overtightening.
6. Cut pipe foam to 4" pipe circumference and secure with silicone around “user-end” of scope.

Just the Facts!

Herbicide Use for Controlling Exotic Aquatic Plants in New Hampshire

The exotic aquatic plant problem

An exotic aquatic plant is a non-native plant that grows in water. Exotic aquatic plants often multiply rapidly and crowd out native plants because they have no natural enemies.

New Hampshire currently has five exotic aquatic plants, of which variable-leafed milfoil is by far the most common. The other plants, which tend to be localized in a few waterbodies, are Eurasian milfoil, fanwort, water chestnut and Brazilian elodea. All but water chestnut can spread by fragmentation because new plants can grow from broken pieces of mature plants. They are most often spread by boaters when fragments "hitch a ride" on a boat transported from an infested waterbody to another, or by release to the environment of plants or fragments from a home aquarium or fish tank. Other exotic plants such as purple loosestrife and common reed (*Phragmites*) grow in wet soils and along the margins of waterbodies but are not truly aquatic based on the above definition.

Controlling exotic aquatic plants

The best way to control exotic plants is to prevent their introduction into a waterbody in the first place. This is done through education (association talks, signs at boat ramps, fact sheets, newsletters, news articles, reports and web sites [www.des.state.nh.us/wmb/exoticspecies]), regulation (it is illegal to sell or transport exotic plants in New Hampshire), through the Weed Watcher Program, and by physically inspecting boats as they are launched into or taken out of waterbodies (Lake Host Program).

The next best way to control exotic aquatic plants is to detect and remove them early, before they can spread within the waterbody and become well established. Early detection is accomplished through the Weed Watcher program in which trained volunteers look for and identify exotic plants in their lake. Frequent (at least monthly) summer surveys are required because these nuisance plants are fast growers and can spread throughout a waterbody within two to three years if not detected early.

Various techniques are used to control established infestations of exotic plants, although none has been successful at eradicating an established growth.

Herbicide treatment is by far the most commonly used technique in New Hampshire and, for most situations, is the most cost effective. Other techniques include hand pulling and screening, mechanical harvesting and hydro-raking, habitat manipulation (water level drawdown, dredging), and biological controls.

Herbicides used for exotic aquatic weed control

Currently, two herbicides are used to control exotic milfoil in New Hampshire. The first is diquat dibromide, trade name Reward. This is a contact herbicide that is applied to the water as a liquid, is rapidly absorbed through the leaf cuticle, and acts by interfering with photosynthesis. Diquat generally kills only the plant material it comes in contact with and has little or no effect on the root system in the bottom sediments. Plants generally turn brown within 10 to 14 days. Diquat is rapidly inactivated upon contact with soil.

The second herbicide is 2,4-D, trade names Aqua-Kleen and Navigate. 2,4-D is a systemic herbicide. It is generally applied in the aquatic environment mixed with clay as a pellet that sinks to the bottom and slowly releases the chemical. Upon absorption by roots or leaves, the herbicide kills the entire plant by causing an abnormal growth response. Because the roots are killed, 2,4-D generally has a longer-lasting effect than diquat, but exotic plants can return the following summer.

Both herbicides are most effective if applied when the plants are young and growing rapidly. Most appli-

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Just the Facts!

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cations in New Hampshire occur in late May or in June. Because soil particles inactivate diquat, it cannot be applied in turbid water.

Procedures and requirements for herbicide use

All herbicides are registered with EPA and have a label issued by EPA that describes the allowed uses of the pesticide, the concentrations, and restrictions on subsequent use of plants, land, or water to which the herbicides has been applied.

In New Hampshire, herbicide use is regulated by the Division of Pesticide Control (DPC) in the Department of Agriculture, Markets and Food. Herbicides must be registered in New Hampshire and the label must

Aquatic Control Technology, Inc., gearing up for an herbicide treatment of Cobbetts Pond, Windham.

specify use for aquatic weed control in order to be used in any surface waters in New Hampshire. A permit is required from DPC and only an applicator licensed by DPC can apply the herbicide in New Hmapshire. DES provides technical and financial assistance to individuals and organizations for herbicide applications to control exotic aquatic plants, and consults with DPC during the permitting process. Prior to issuing an aquatic permit, DPC receives input from other state agencies including the Fish and Game Department, the Division of Public Health, the Department of Environmental Services and the Division of Forests and Lands.

Water Use restrictions after herbicide treatment

Water use restrictions following herbicide treatment are specified on the EPA label. These restrictions are specified to protect human health. DPC may impose additional restrictions to protect human health or the health of other non-target species. For diquat, at the maximum application rate of two gallons/acre, label restrictions prohibit the use of the water for drinking for three days, no days for swimming and fishing, one day for livestock consumption, three days for turf and ornamental irrigation and five days for food crop irrigation. DPC, on advice of the Division of Public Health, imposes a one day prohibition for swimming.

For 2,4-D, the Navigate label states “do not apply to waters used for irrigation, agricultural sprays, watering dairy animals or domestic water supplies” (domestic water is interpreted as any household use including drinking, bathing, cooking and watering plants). The Aqua-Kleen label indicates that the treated water should not be used for irrigation until the 2,4-D concentration is 100 parts per billion (ppb) or less, and should not be used for drinking water until the concentration is 70 ppb or less. Neither label has a swimming or fishing restriction but DPC, on advice of the Division of Public Health, imposes a seven day restriction on swimming. For both 2,4-D trade names, DPC requires sampling of the water 15 and 30 days following a treatment.

A minimum 30 day restriction is imposed on using the water for domestic purposes or irrigation, longer if the 30 day sample is not less than 70 ppb or 100 ppb respectively.

State Grants for Exotic Aquatic Plant Control

For *new* exotic plant infestations, DES is authorized to initiate and pay 100 percent of the costs of treatment. For *existing* infestations, DES is authorized to provide matching funds to towns, lake association, businesses or individuals for the cost of treatment. For herbicide treatment, the entity contracts with a licensed applicator for the treatment, pays the cost, and DES reimburses the entity for a percentage of the costs (usually 50 percent). A limited amount of funds are available for exotic plant control projects and requests for funding are subject to a prioritization process to determine selection for funding.

Aquatic Herbicides- The Basics

2,4-D
Tradenames: Navigate and Aqua-Kleen

What is 2,4-D?

2,4-D is an aquatic herbicide which kills unwanted weeds within four to six weeks upon application. 2,4-D was first registered with the EPA in 1948 and is formulated in various esters, and amines in flakes, granules, or liquids.

How does 2,4-D work?

2,4-D disrupts the pattern of cell division in the meristem (actively growing and dividing region) of the leaves, roots, and stems of broadleaf plants.

What is the residence time of 2,4-D in a water body?

2,4-D is decomposed by soil organisms into humic acid within two to four weeks upon application. Concentrations of this herbicide are also reduced through dispersal by water movement and adsorption by sediments. 2,4-D degrades quickly in aerobic silty clay and loam soil.

Is there any potential for bioaccumulation/toxicity?

2,4-D, when used in accordance with the label, does not infiltrate into groundwater. The potential to contaminate groundwater is limited by its rapid rate of degradation and uptake by target plants. Residues that have been detected in groundwater have mostly occurred at point source sites such as mixing, loading, and dispersal sites. Toxicity for fish is variable depending on formulation and species. The granular ester formulations of this herbicide prove to be less hazardous to aquatic life than the liquid ester. The amine formulation is far less toxic than both ester forms. New Hampshire has not seen any impacts to fisheries from the use of this herbicide.

What are the drawbacks of using 2,4-D?

Since 2,4-D is a selective herbicide, it is only effective on certain species of aquatic plants.

Diquat
Tradename: Reward

What is Diquat?

Diquat is a nonselective contact herbicide which kills undesirable weed growth within seven days, but usually within one to two days.

How does Diquat work?

Diquat causes the production of hydrogen peroxide, which is quickly absorbed by broadleaf and grassy weeds and works by directly damaging cell tissues.

What is the residence time of Diquat in a water body?

Diquat in a lake or pond is reduced by approximately 90 percent or more within 13 days after application. It is reduced by binding to plants and lake sediments. The remaining soil residues are ultimately unavailable to plants.

Is there any potential for bioaccumulation/toxicity?

Diquat has variable potential for bioaccumulation in aquatic organisms based on factors such as water hardness, species, and age of fish. Diquat is toxic to organisms such as invertebrates and amphipods, however toxicity for mammals is moderate. New Hampshire has not seen any impacts to fisheries or other aquatic life from the use of this herbicide.

What are the drawbacks of using Diquat?

Diquat does not kill parts of a plant that it does not directly contact. Diquat is not effective in lakes or ponds with turbid water or where plants are covered with silt because it is strongly attracted to silt and clay particles in the water. Therefore, bottom sediments should not be disturbed during treatment.

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WW Reminders & Updates

As of the printing of this newsletter, there has been only one new documented exotic plant infestation in a waterbody. In July 2004, variable milfoil was positively identified from a specimen collected below the confluence of the Merrimack River and the Contoocook River in Penacook. The Upper Merrimack Local Advisory Committee (UMRLAC) found the plants in 2003, but without fruit or flower, DES was unable to identify the plant. This year, Steve Landry (of both DES and UMRLAC) collected a plant specimen for identification. The Merrimack River will now be added to the list of infested waters.

Overall, the combined efforts of Lake Hosts and Weed Watchers have considerably slowed the spread of new infestations by preventing boats from launching into waterbodies without conducting an inspection to see if there are invasive plants attached, and by finding new infestations early so that they can be managed through less intensive management strategies. But that does not mean that we can become complacent. Milfoil is still on the move in the broad sense, and new exotics are lurking right over our borders.

Lakes that are uninfested should remain vigilant, and lakes already infested should still try to prevent the introduction of *new* exotics, and to prevent their lake from contaminating others.

If you are interested in participating in the Lake Host Program, contact Nancy Christie of the New Hampshire Lakes Association at (603) 226-0299 or nchristie@nhlakes.org